

OIFE

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/883,797

DATE: 08/08/2001

TIME: 19:27:47

Input Set : N:\Crf3\RULE60\09883797.txt

Output Set: N:\CRF3\08082001\I883797.raw

ENTERED

```

4 <110> APPLICANT: Jaworski, Jan G.
5   Post-Beittenmiller, Martha A.
6   Todd, James
9 <120> TITLE OF INVENTION: FATTY ACID ELONGASES
13 <130> FILE REFERENCE: 07148/064001
15 <140> CURRENT APPLICATION NUMBER: 09/883,797
16 <141> CURRENT FILING DATE: 2001-06-18
18 <150> PRIOR APPLICATION NUMBER: 08/868,373
19 <151> PRIOR FILING DATE: 1997-06-03
21 <160> NUMBER OF SEQ ID NOS: 22
23 <170> SOFTWARE: FastSEQ for Windows Version 3.0
25 <210> SEQ ID NO: 1
26 <211> LENGTH: 1560
27 <212> TYPE: DNA
28 <213> ORGANISM: Arabidopsis thaliana
30 <400> SEQUENCE: 1
31   atggatcgag agagattaac ggcggagatg gcggttcgag attcatcatc ggccggttata
32   agaattcgaa gacgtttgcc ggatttatta acgtccgtta agtcaaata cgtgaagctt
33   ggacttcaca actcttgcaa cgtgaccacc attctcttct tcttaattat tcttccttta
34   accggaaccg tgctggttca gctaaccggg ctaacgttcg atacgttctc tgagctttgg
35   tctaaccagg cggttcaact cgacacggcg acgagactta cctgcttggg tttcctctcc
36   ttcgttttga ccctctacgt ggctaaccgg tctaaccggg tttacctagt ggatttctcc
37   tgctacaaac cggaagacga gcgtaaaata tcagtagatt cgttcttgac gatgactgag
38   gaaaatggat cattcacga tgacacgggt cagttccagc aaagaatctc gaaccgggcc
39   ggtttgggag acgagacgta tctgccacgt ggcataactt caacgcccc gaagctaaat
40   atgtcagagg cacgtgccga agctgaagcc gttatgtttg gagccttaga ttcctctctc
41   gagaaaaccg gaattaaacc ggccgaagtc ggaatcttga tagtaaaactg cagcttatctc
42   aatccgacgc cgtctctatc agcgatgatc gtgaaccatt acaagatgag agaagacatc
43   aaaagttaca acctcggagg aatgggttgc tccgccggat taatctcaat cgatctcgct
44   aacaatctcc tcaaagcaaa ccctaattct tacgtgtcgc tggtaagcac ggaaaacata
45   accctaaact ggtacttcgg aaatgaccgg tcaatgctcc tctgcaactg catcttccga
46   atgggcgagg ctgcgattct cctctctaac cgccgtcaag accggaagaa gtcaaagtac
47   tcgctggtca acgtcgttcg aacacataaa ggatcagacg acaagaacta caattgcgtg
48   taccagaagg aagacgagag aggaacaatc ggtgtctctt tagctagaga gctcatgtct
49   gtcgccggag acgctctgaa aacaacatc acgactttag gaccgatggt tcttccattg
50   tcagagcagt tgatgttctt gatttccttg gtcaaaagga agatgttcaa gttaaaagtt
51   aaaccgtata ttccggattt caagctagct ttcgagcatt tctgtattca cgcaggagggt
52   agagcggttc tagacgaagt gcagaagaat cttgatctca aagattggca catggaacct
53   tctagaatga cttgcacag atttggtaac acttcgagta gctcgctttg gtatgagatg
54   gcttataacc aagctaaggg tcgggttaaa gctggtgacc gactttggca gattgcgttt
55   ggatcggggt tcaagtgtaa tagtgcggtt tggaaagcgt tacgaccggg ttcgacggag
56   gagatgaccg gtaatgcttg ggctgggtcg attgatcaat atccggttaa agttgtgcaa
58 <210> SEQ ID NO: 2
59 <211> LENGTH: 520
60 <212> TYPE: PRT
61 <213> ORGANISM: Arabidopsis thaliana
63 <400> SEQUENCE: 2

```

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/883,797

DATE: 08/08/2001

TIME: 19:27:47

Input Set : N:\CrF3\RULE60\09883797.txt

Output Set: N:\CRF3\08082001\I883797.raw

```

64 Met Asp Arg Glu Arg Leu Thr Ala Glu Met Ala Phe Arg Asp Ser Ser
65 1 5 10 15
66 Ser Ala Val Ile Arg Ile Arg Arg Arg Leu Pro Asp Leu Leu Thr Ser
67 20 25 30
68 Val Lys Leu Lys Tyr Val Lys Leu Gly Leu His Asn Ser Cys Asn Val
69 35 40 45
70 Thr Thr Ile Leu Phe Phe Leu Ile Ile Leu Pro Leu Thr Gly Thr Val
71 50 55 60
72 Leu Val Gln Leu Thr Gly Leu Thr Phe Asp Thr Phe Ser Glu Leu Trp
73 65 70 75 80
74 Ser Asn Gln Ala Val Gln Leu Asp Thr Ala Thr Arg Leu Thr Cys Leu
75 85 90 95
76 Val Phe Leu Ser Phe Val Leu Thr Leu Tyr Val Ala Asn Arg Ser Lys
77 100 105 110
78 Pro Val Tyr Leu Val Asp Phe Ser Cys Tyr Lys Pro Glu Asp Glu Arg
79 115 120 125
80 Lys Ile Ser Val Asp Ser Phe Leu Thr Met Thr Glu Glu Asn Gly Ser
81 130 135 140
82 Phe Thr Asp Asp Thr Val Gln Phe Gln Gln Arg Ile Ser Asn Arg Ala
83 145 150 155 160
84 Gly Leu Gly Asp Glu Thr Tyr Leu Pro Arg Gly Ile Thr Ser Thr Pro
85 165 170 175
86 Pro Lys Leu Asn Met Ser Glu Ala Arg Ala Glu Ala Glu Ala Val Met
87 180 185 190
88 Phe Gly Ala Leu Asp Ser Leu Phe Glu Lys Thr Gly Ile Lys Pro Ala
89 195 200 205
90 Glu Val Gly Ile Leu Ile Val Asn Cys Ser Leu Phe Asn Pro Thr Pro
91 210 215 220
92 Ser Leu Ser Ala Met Ile Val Asn His Tyr Lys Met Arg Glu Asp Ile
93 225 230 235 240
94 Lys Ser Tyr Asn Leu Gly Gly Met Gly Cys Ser Ala Gly Leu Ile Ser
95 245 250 255
96 Ile Asp Leu Ala Asn Asn Leu Leu Lys Ala Asn Pro Asn Ser Tyr Ala
97 260 265 270
98 Val Val Val Ser Thr Glu Asn Ile Thr Leu Asn Trp Tyr Phe Gly Asn
99 275 280 285
100 Asp Arg Ser Met Leu Leu Cys Asn Cys Ile Phe Arg Met Gly Gly Ala
101 290 295 300
102 Ala Ile Leu Leu Ser Asn Arg Arg Gln Asp Arg Lys Lys Ser Lys Tyr
103 305 310 315 320
104 Ser Leu Val Asn Val Val Arg Thr His Lys Gly Ser Asp Asp Lys Asn
105 325 330 335
106 Tyr Asn Cys Val Tyr Gln Lys Glu Asp Glu Arg Gly Thr Ile Gly Val
107 340 345 350
108 Ser Leu Ala Arg Glu Leu Met Ser Val Ala Gly Asp Ala Leu Lys Thr
109 355 360 365
110 Asn Ile Thr Thr Leu Gly Pro Met Val Leu Pro Leu Ser Glu Gln Leu
111 370 375 380
112 Met Phe Leu Ile Ser Leu Val Lys Arg Lys Met Phe Lys Leu Lys Val

```

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/883,797

DATE: 08/08/2001

TIME: 19:27:47

Input Set : N:\CrF3\RULE60\09883797.txt
Output Set: N:\CRF3\08082001\I883797.raw

```

113 385
114 Lys Pro Tyr Ile Pro Asp Phe Lys Leu Ala Phe Glu His Phe Cys Ile 400
115 405
116 His Ala Gly Gly Arg Ala Val Leu Asp Glu Val Gln Lys Asn Leu Asp 415
117 420
118 Leu Lys Asp Trp His Met Glu Pro Ser Arg Met Thr Leu His Arg Phe 430
119 435
120 Gly Asn Thr Ser Ser Ser Ser Leu Trp Tyr Glu Met Ala Tyr Thr Glu 445
121 450
122 Ala Lys Gly Arg Val Lys Ala Gly Asp Arg Leu Trp Gln Ile Ala Phe 460
123 465
124 Gly Ser Gly Phe Lys Cys Asn Ser Ala Val Trp Lys Ala Leu Arg Pro 480
125 485
126 Val Ser Thr Glu Glu Met Thr Gly Asn Ala Trp Ala Gly Ser Ile Asp 495
127 500
128 Gln Tyr Pro Val Lys Val Val Gln 505
129 515
131 <210> SEQ ID NO: 3 520
132 <211> LENGTH: 1479
133 <212> TYPE: DNA
134 <213> ORGANISM: Arabidopsis thaliana
136 <400> SEQUENCE: 3
137 atggattacc ccatgaagaa ggtaaaaatc tttttcaact acctcatggc gcatcgcttc 60
138 aagctctgct tcttaccatt aatggttgct atagccgtgg aggcgtctcg tctttccaca 120
139 caagatctcc aaaactttta cctctactta caaaacaacc acacatctct aaccatgttc 180
140 ttcttttacc tcgctctcgg gtcgactctt tacctcatga cccggcccaa acccgtttat 240
141 ctggttgact ttagctgcta cctcccaccg tcgcatctca aagccagcac ccagaggatc 300
142 atgcaacacg taaggcttgt acgagaagca ggcgcgtgga agcaagagtc cgattacttg 360
143 atggacttct gcgagaagat tctagaacgt tccggtctag gccaagagac gtacgtaccc 420
144 gaaggtcttc aaactttgcc actacaacag aatttggtcg tatcacgtat agagacggag 480
145 gaagttatta ttggtgcggt cgataatctg tttcgcaaca cggaataaag ccctagtgat 540
146 ataggtatat tgggtggtgaa ttcaagcact tttaatccaa caccttcgct atcaagtatc 600
147 ttagtgaata agtttaaaact tagggataat ataaagagct tgaatcttgg tgggatgggg 660
148 tgtagcgctg gagtcacgc tatcgatgcg gctaagagct tgttacaagt tcatagaaac 720
149 acttatgctc ttgtggtgag cacggagaac atcactcaaa acttgtacat gggtaacaac 780
150 aaatcaatgt tggttacaaa ctgtttgttc cgtatagggt gggccgcgat tttgctttct 840
151 aaccggtcta tagatcgtaa acgcgcaaaa tacgagcttg ttcacaccgt gcgggtccat 900
152 accggagcag atgaccgatc ctatgaatgt gcaactcaag aagaggatga agatggcata 960
153 gttgggggtt ccttgtcaaa gaatctacca atggtagctg caagaaccct aaagatcaat 1020
154 atcgcaactt tgggtccgct tgttcttccc ataaagcaga agtttcactt ctttgtgagg 1080
155 ttcgttaaaa agaagtttct caaccccaag ctaaagcatt acattccgga tttcaagctc 1140
156 gcattcgagc atttctgtat ccatgcgggt ggtagagcgc taattgatga gatggagaag 1200
157 aatcttcac taactccact agacgttgag gcttcaagaa tgacattaca caggtttggt 1260
158 aatacctctt cgagctccat ttggtacgag ttggttaca cagaagccaa aggaaggatg 1320
159 acgaaaggag ataggatttg gcagattgag ttgggggtcag gttttaagt taatagttca 1380
160 gtttgggtgg ctcttcgtaa cgtcaagcct tctactaata atccttggga acagtgtcta 1440
161 cacaaatc cagttgagat cgatatagat ttaaaagag
163 <210> SEQ ID NO: 4
164 <211> LENGTH: 493

```

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/883,797

DATE: 08/08/2001

TIME: 19:27:47

Input Set : N:\CrF3\RULE60\09883797.txt
Output Set: N:\CRF3\08082001\I883797.raw

```

165 <212> TYPE: PRT
166 <213> ORGANISM: Arabidopsis thaliana
168 <400> SEQUENCE: 4
169 Met Asp Tyr Pro Met Lys Lys Val Lys Ile Phe Phe Asn Tyr Leu Met
170 1 5 10 15
171 Ala His Arg Phe Lys Leu Cys Phe Leu Pro Leu Met Val Ala Ile Ala
172 20 25 30
173 Val Glu Ala Ser Arg Leu Ser Thr Gln Asp Leu Gln Asn Phe Tyr Leu
174 35 40 45
175 Tyr Leu Gln Asn Asn His Thr Ser Leu Thr Met Phe Phe Leu Tyr Leu
176 50 55 60
177 Ala Leu Gly Ser Thr Leu Tyr Leu Met Thr Arg Pro Lys Pro Val Tyr
178 65 70 75 80
179 Leu Val Asp Phe Ser Cys Tyr Leu Pro Pro Ser His Leu Lys Ala Ser
180 85 90 95
181 Thr Gln Arg Ile Met Gln His Val Arg Leu Val Arg Glu Ala Gly Ala
182 100 105 110
183 Trp Lys Gln Glu Ser Asp Tyr Leu Met Asp Phe Cys Glu Lys Ile Leu
184 115 120 125
185 Glu Arg Ser Gly Leu Gly Gln Glu Thr Tyr Val Pro Glu Gly Leu Gln
186 130 135 140
187 Thr Leu Pro Leu Gln Gln Asn Leu Ala Val Ser Arg Ile Glu Thr Glu
188 145 150 155 160
189 Glu Val Ile Ile Gly Ala Val Asp Asn Leu Phe Arg Asn Thr Gly Ile
190 165 170 175
191 Ser Pro Ser Asp Ile Gly Ile Leu Val Val Asn Ser Ser Thr Phe Asn
192 180 185 190
193 Pro Thr Pro Ser Leu Ser Ser Ile Leu Val Asn Lys Phe Lys Leu Arg
194 195 200 205
195 Asp Asn Ile Lys Ser Leu Asn Leu Gly Gly Met Gly Cys Ser Ala Gly
196 210 215 220
197 Val Ile Ala Ile Asp Ala Ala Lys Ser Leu Leu Gln Val His Arg Asn
198 225 230 235 240
199 Thr Tyr Ala Leu Val Val Ser Thr Glu Asn Ile Thr Gln Asn Leu Tyr
200 245 250 255
201 Met Gly Asn Asn Lys Ser Met Leu Val Thr Asn Cys Leu Phe Arg Ile
202 260 265 270
203 Gly Gly Ala Ala Ile Leu Leu Ser Asn Arg Ser Ile Asp Arg Lys Arg
204 275 280 285
205 Ala Lys Tyr Glu Leu Val His Thr Val Arg Val His Thr Gly Ala Asp
206 290 295 300
207 Asp Arg Ser Tyr Glu Cys Ala Thr Gln Glu Glu Asp Glu Asp Gly Ile
208 305 310 315 320
209 Val Gly Val Ser Leu Ser Lys Asn Leu Pro Met Val Ala Ala Arg Thr
210 325 330 335
211 Leu Lys Ile Asn Ile Ala Thr Leu Gly Pro Leu Val Leu Pro Ile Ser
212 340 345 350
213 Glu Lys Phe His Phe Phe Val Arg Phe Val Lys Lys Lys Phe Leu Asn
214 355 360 365

```

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/883,797

DATE: 08/08/2001

TIME: 19:27:47

Input Set : N:\CrF3\RULE60\09883797.txt
Output Set: N:\CRF3\08082001\I883797.raw

```

215 Pro Lys Leu Lys His Tyr Ile Pro Asp Phe Lys Leu Ala Phe Glu His
216      370      375      380
217 Phe Cys Ile His Ala Gly Gly Arg Ala Leu Ile Asp Glu Met Glu Lys
218      385      390      395      400
219 Asn Leu His Leu Thr Pro Leu Asp Val Glu Ala Ser Arg Met Thr Leu
220      405      410      415
221 His Arg Phe Gly Asn Thr Ser Ser Ser Ile Trp Tyr Glu Leu Ala
222      420      425      430
223 Tyr Thr Glu Ala Lys Gly Arg Met Thr Lys Gly Asp Arg Ile Trp Gln
224      435      440      445
225 Ile Ala Leu Gly Ser Gly Phe Lys Cys Asn Ser Ser Val Trp Val Ala
226      450      455      460
227 Leu Arg Asn Val Lys Pro Ser Thr Asn Asn Pro Trp Glu Gln Cys Leu
228      465      470      475      480
229 His Lys Tyr Pro Val Glu Ile Asp Ile Asp Leu Lys Glu
230      485      490
232 <210> SEQ ID NO: 5
233 <211> LENGTH: 1512
234 <212> TYPE: DNA
235 <213> ORGANISM: Arabidopsis thaliana
237 <400> SEQUENCE: 5
238 ctacgtcagg gtagaacaac gagtaaacac ttaagcaaaa caatttgtcc tactcttagg      60
239 ttatctccaa tgaagaactt aaagatgggt ttcttcaaga tcctctttat ctctttaatg      120
240 gcaggattag ccatgaaagg atctaagatc aacgtagaag atctccaaaa gttctccctc      180
241 caccatacac agaacaacct ccaaaccata agccttctat tgtttcttgt cgtttttgtg      240
242 tggatcctct acatgttaac ccgacctaaa cccgtttacc ttgttgattt ctctgctac      300
243 cttccaccgt cgcattcaca ggtagtatc caaacctaa tgggacacgc aagacgtgca      360
244 agagaagcag gcatgtgttg gaagaacaaa gagagcgacc atttagttga cttccaggag      420
245 aagattcttg aacgttccgg tcttggtcaa gaaacctaca tccccgaggg tcttcagtgc      480
246 tttccacttc agcaaggcat ggggtgcttca cgtaaagaga cggaagaagt aatcttcgga      540
247 gctcttgaca atctttttcg caacaccggt gtaaaacctg atgatatcgg tatattggtg      600
248 gtgaattcta gcacgtttta tccaactcca tcaactcgct ccatgattgt gaacaagtac      660
249 aaactcagag acaacatcaa gagtttgaat cttggaggga tgggttgcag tgccggagtt      720
250 atagctgttg atgtcgctaa gggattacta caagttcata ggaacactta tgctattgta      780
251 gtaagcacag agaacatcac tcagaactta tacttgggga aaaacaaatc aatgctagtc      840
252 acaaactgtt tgttcgcgct tgggtgtgct gcggttctgc tttcaaacag atctagagac      900
253 cgtaaccgcg ccaaatacga gcttgttcac accgtacgga tccataccgg atcagatgat      960
254 aggtcggtcg aatgtgcgac acaagaagag gatgaagatg gtataattgg agttaccttg      1020
255 acaaagaatc tacctatggt ggctgcaagg actcttaaga taaatatcgc aactttgggt      1080
256 cctcttgtag ttccattaaa agagaagcta gccttcttta ttacttttgt caagaagaag      1140
257 tatttcaagc cagagttaag gaattataca ccagatttca agcttgccct tgagcatttc      1200
258 tgtatccacg ctggtggaag agctctaata gatgagctgg agaagaacct taagctttct      1260
259 ccgttacacg tagaggcgtc aagaatgaca ctacacaggt ttggtaacac ttcttctagc      1320
260 tcaatctggt acgagttagc ttatacagaa gctaaaggaa ggatgaagga aggagatagg      1380
261 atttggcaga ttgctttggg gtcaggtttt aagtgttaaca gttcagtatg ggtggctctg      1440
262 cgagacgtta agccttcagc taacagtcca tgggaagact gtatggatag atatccggtt      1500
263 gagattgata tt
265 <210> SEQ ID NO: 6
266 <211> LENGTH: 504

```

VERIFICATION SUMMARY

PATENT APPLICATION: US/09/883,797

DATE: 08/08/2001

TIME: 19:27:48

Input Set : N:\Crf3\RULE60\09883797.txt

Output Set: N:\CRF3\08082001\I883797.raw